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September 30, 1984



Air Force Office of Scientific Research

Grant Number: AFOSR 83-0232

North Carolina Agricultural and Technical  
State University  
Department of Electrical Engineering  
Greensboro, NC 27411

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HENRY J. KEEPER  
Chief, Technical Information Division

AN X-RAY DIFFRACTION SYSTEM FOR EVALUATING THE EPITAXIAL  
GROWTH OF III-V ALLOY SEMICONDUCTORS

Purpose

The purpose of this grant was the acquisition of an X-ray diffractometer system for use in evaluating the heteroepitaxial growth of III-V semiconducting compounds and alloys. The diffraction data permit a determination of the lattice constant mismatch between the single crystal substrate and the epilayer.

Equipment Purchase

After completing the price quotation and bidding procedures, the purchase order for the X-ray system was issued by the University on July 18, 1984 (Purchase Order No. 145869).

Vendor: Philips Electronic Instruments, Inc.  
85 McKee Drive  
Mahwah, NJ 07430  
(201) 529-3800

Components of System: PW 1729 2500 Watt X-Ray Generator  
APD 3520 Data Acquisition System  
Goniometer + Monochromator + Scintillator  
Detector  
Copper Target X-Ray Tube  
Laue Back Reflection Camera for Dry Film  
Water Chiller, 3500 Watts

Total Cost: \$77,554 (including 4.5% sales tax)

Because of the cost/budget limitations, the tungsten target X-ray tube for use with the Laue camera could not be purchased. This tube shall be acquired with possible future funding (ca. \$2800).

The bid specifications indicated a 120-day delivery. Philips Electronics has acknowledged entering the order on July 31, 1984.

The following are active research contracts/grants which could utilize the capabilities of the X-ray diffraction system. It is assumed that once the X-ray diffraction system is operational, various materials research projects in the Department of Mechanical Engineering may also benefit from its presence.

"Material Growth and Characterization for Solid State Devices"

Dr. E. K. Stefanakos, EE

NASA, Grant No. NSG 1390

December 1, 1983--November 30, 1984 (first year of a three-year grant)

"Heteroepitaxial Growth of III-V Semiconductor Compounds by Metal Organic Chemical Vapor Deposition for Device Applications"

Dr. W. J. Collis, EE

NASA Grant No. NAG-1-403

October 1, 1984--September 30, 1985 (second year of a three-year grant)

"Current Controlled LPE Growth of InGaAsP"

Dr. E. K. Stefanakos, EE

U. S. Army Research Office, Grant No. DAAG-29-84-G-0003

July 1, 1984--June 30, 1985 (first year of a three-year grant)